Siting and Design Considerations for New and Expanding Marinas

Environmental Concerns

The natural plant and animal communities in coastal areas serve multiple functions. Wetlands, for example, provide habitat for fish and fowl, minimize erosion, and act as a filter to purify stormwater runoff. Coastal areas have such ecological, economic, recreational, and aesthetic values that shoreline development must be done carefully.

Many factors influence the long-term effect a marina will have on water quality within the immediate vicinity of the marina and the adjacent waterway. Initial marina site selection is the most important factor. Selecting a site that has favorable hydro-geographic characteristics and requires the least amount of modification can reduce both potential impacts and the expense of retroactively addressing adverse environmental or public impacts.

Laws and Permits

Building in Navigable Waters

Construction of any bridge, dam, dike, or causeway over or in the navigable waters of the U.S. without authorization from the U.S. Coast Guard is prohibited by Section 9 of the Federal Rivers and Harbors Act of 1899 (33 U.S.C. 401). Section 10 of the act (33 U.S.C. 403) also requires that businesses receive permits from the U.S. Army Corps of Engineers (USACE) before building structures such as wharfs, jetties, or piers.

Marina Construction and Dredging

The Clean Water Act sets standards for the discharge of dredge or fill materials into navigable waters, including wetlands. Under Section 404 of the act (33 U.S.C. 1344), the majority of marina development and expansion projects along the Great Lakes, including dredging, will require a joint permit from USACE, the Illinois Department of Natural Resources (IDNR), and the Illinois Environmental Protection Agency (IEPA). In addition, 17 IAC 3704 requires a permit from IDNR for construction projects in any public body of water. More information on dredging permits can be found at www.dnr.state.il.us/Wetlands/ch4b.htm.

Fish and Wildlife Impact Review

The Fish and Wildlife Coordination Act (16 U.S.C. 661) requires a U.S. Fish and Wildlife Service (USFWS) review of potential effects on fish and wildlife from proposed water resource development projects. The act requires that fish and wildlife resources receive

consideration equal to other project features. In addition, it also requires federal agencies that construct, license, or permit water resource development projects, such as USACE, to first consult with USFWS and relevant state and local agencies to mitigate impacts on fish and wildlife.

Best Management Practices for Site Selection

Redevelop Existing Sites

Redeveloping previously used sites (brownfields) restores property to productive uses, reduces pressure to develop unused areas (greenfields), increases property values, and mitigates public health and safety concerns. The state offers financial assistance for the redevelopment of brownfields. For more information, visit www.epa.state.il.us/land/brownfields/faq.html.

- ✓ Locate new facilities on brownfields rather than disturbing greenfields.
- ✓ Secure the proper permits before beginning any development project, including dredging. See the Marina Design and Maintenance chapter for more details.

Characterize Project Site

Marina protection must be carefully designed. Incorrectly designed structures may amplify wave action, thereby exacerbating erosion, creating excessive shoaling, and interrupting or restricting circulation.

- ✓ Identify local nearshore coastal processes to ensure any new development will not change these natural processes.
- ✓ Determine the different habitat types in the area and how the site is used by fish, waterfowl, and other organisms.
- ✓ Find the present shoreline and avoid designing shoreline facilities that extend past that line.
- ✓ Identify areas prone to ice flows, which can cause oil and gas spills and the deposition of debris and other substances.
- ✓ Determine the size, configuration, location, and proper materials for protection structures. For additional information, refer to the Environmental Protection Agency (EPA) Coastal Marina Assessment Handbook.
- ✓ Hire a private consulting firm to perform a site assessment, if necessary.
- ✓ Ensure that any previous environmental contamination has been cleaned up.

Identify Rare and Endangered Species

- ✓ Do not disturb rare and endangered species. (520 ILCS 10/1 and 17 IAC 1075).
- ✓ Ensure that USFWS and IDNR have assessed all proposed development sites for endangered and threatened species and habitat protection areas. For more information on nearby sensitive habitat areas, submit a project description and a photocopy of a United States Geological Survey topographic quadrangle map, with the site identfied, to USFWS at www.fws.gov.
- ✓ Implement an approved protection plan if protected species are identified. A protection plan must be implemented for a project to receive approval.
- ✓ Submit a mitigation or habitat enhancement plan to USACE and USFWS.

Avoid Submerged Aquatic Vegetation

- ✓ Avoid or mitigate any disturbances to submerged aquatic vegetation (SAV). SAV provide habitat for fish and food for waterfowl and are an important component of a healthy coastal ecosystem.
- ✓ Avoid depositing dredged material where it can interfere with SAV.
- ✓ Position new or expanded marinas where navigation over SAV beds won't be necessary.

Minimize Disturbance to Wetlands

Any construction that extends into wetland areas requires authorization or permits from IDNR and USACE.

- ✓ Minimize disturbance to wetlands and native vegetation in coastal or shoreline areas. Refer to 17 IAC 1090.20 for a list of activities that require state review.
- ✓ Preserve and, where possible, increase wetland acreage and function.
- ✓ Mitigate disturbances to wetlands when loss is unavoidable.
- ✓ Build wetlands on the down-current side of marinas.

Minimize Disturbance to Fish and Wildlife

- ✓ Consult with IDNR for site-specific assessments of the potential impacts to wildlife populations caused by marina siting or construction.
- ✓ Schedule construction to avoid critical migration,

nesting, and spawning periods of important species of fish and wildlife (42 U.S.C. 4321).

- ✓ Preserve nesting trees and other natural habitats where possible.
- ✓ Locate marinas away from waterfowl nesting and staging areas (16 U.S.C. 703-712).

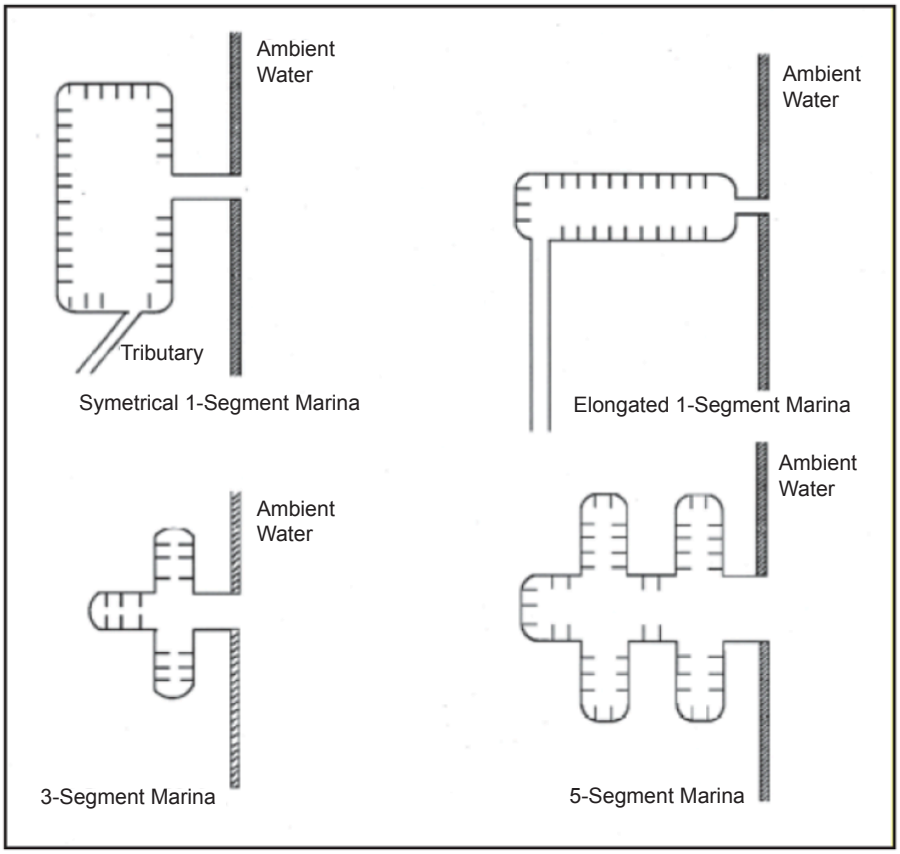
Enhance Water Circulation

The water quality and biological health of marinas depend largely on how well water circulates and is flushed within and through the basin. If a marina is not properly designed, pollutants will build up in the water or sediment. Excess dredging to create deeper water can also slow flows and diminish the re-oxygenation of water in the marina basin.

- ✓ Select an open design for new or expanding marinas. Open marina designs have little or no fabricated or natural barriers to restrict the exchange of water between the lake or river and the marina.
- ✓ Design new or expanding marinas with as few segments as possible to promote circulation within the basin (refer to figure on the next page). The fewer the segments, the better the circulation.
- ✓ Locate marinas along well-flushed waterways.
- ✓ Align entrance channels with natural channels to increase flushing.
- ✓ Avoid locating the entrance channel perpendicular to the natural channel, as shoaling may increase the need for maintenance dredging.
- ✓ Avoid using long, winding channels to connect marinas to open water.
- ✓ Where possible, establish two openings at opposite ends of the marina to promote flow-through currents.
- ✓ Choose fixed or floating structures that encourage rather than impede water movement. Floating dock systems can be removed in the winter to avoid ice damage and the debris that may result. Floating structures also accumulate zebra and quagga mussels, which can be easily removed when the docks are stored on land.
- ✓ Install wave attenuators to reduce the force of incoming water if protection is necessary. Wave attenuators do not restrict water exchange or significantly interfere with fish migration or shoreline processes. They are also easily

removed

- ✓ Use a mechanical aeration system to aerate areas with poor circulation. Circulators can also minimize icing during winter.
- ✓ Inspect aeration systems routinely to avoid encrustation of zebra or quagga mussels and other organisms. Submersible pumps, or airlines for bubbling systems, may be protected with materials that resist attachment, such as



Example of marina designs (Source: U.S. EPA 2001)

copper, brass, and galvanized steel.

Consider Bottom Configurations

- ✓ Develop facilities by cutting into the upland areas rather than building out into the bottomland or shallow nearshore areas. This prevents the loss of access to public trust waters and bottomland.
- ✓ Design marinas to accommodate a gradual downward slope from the berthing area into deeper water, if possible.
- ✓ Avoid canals, irregular pockets, and sumps that are deeper than adjacent channels.
- ✓ Avoid square corners in marina basins and dead-end

channels wherever possible.

Evaluate Upland Impacts

- ✓ Investigate runoff drainage through the proposed site and avoid siting buildings in drainage areas (40 CFR 122.26).
- ✓ Avoid steep slopes where serious erosion can occur.
- ✓ Identify and avoid areas with high groundwater during wet periods.

Design Environmentally-Friendly Facilities

- ✓ Design facilities to meet the U.S. Green Building Council's Leadership in Energy and Environmental Design certification requirements. Visit new.usgbc.org/leed for more information.
- ✓ Build new pilings and other structures in or above the water with materials that will not leach hazardous chemicals into the water or degrade in fewer than 10 years. Possible materials include reinforced concrete, coated steel, recycled plastic, vinyl sheet piling, or plastic reinforced with fiberglass.
- ✓ Contain shavings when cutting plastic pilings and timbers at your marina.
- ✓ Do not use wood treated with creosote for pilings or similar structures in or above the water.
- ✓ Use naturally durable timbers conservatively. Black locust, cedar, chestnut, and white oak are naturally durable but expensive and may be hard to find.
- ✓ Avoid exotic timbers. Although tropical trees such as greenheart and bongossi are also naturally durable, their harvest is harmful to tropical forests.
- ✓ Use recyclable decking material.
- ✓ Purchase floatable foams that have been encapsulated in plastic to ensure that degraded foam is contained as floats age.